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ContraVision: Presenting Contrasting Visions of Future Technology

Blaine A. Price

Dept. of Computing
The Open University
Milton Keynes, UK, MK7 6AA
B.A.Price@open.ac.uk

Clara Mancini

Dept. of Computing
The Open University
Milton Keynes, UK, MK7 6AA

Yvonne Rogers

Dept. of Computing
The Open University
Milton Keynes, UK, MK7 6AA

Arosha K. Bandara

Dept. of Computing
The Open University
Milton Keynes, UK, MK7 6AA

Tony Coe

Two Cats Can
6 Staplehall Road
Bletchley, UK MK1 1BQ

Adam N. Joinson

School of Management
University of Bath
Bath, UK, BA2 7AY

Jeffrey A. Lay

Dept. of Computing
The Open University
Milton Keynes, UK, MK7 6AA

Bashar Nuseibeh

Dept. of Computing
The Open University, UK and
Lero, Univ. of Limerick, Ireland

Abstract

How can we best explore the range of users' reactions when developing future technologies that may be controversial, such as personal healthcare systems? Our approach – ContraVision – uses futuristic videos, or other narrative forms, that convey both negative and positive aspects of the proposed technology for the same scenarios.

Keywords

ContraVision, video, narrative representation, personal technology, pervasive healthcare, user studies

ACM Classification Keywords

D.2.1: Requirements: elicitation methods; J.4 Social and Behavioral Sciences: sociology

General Terms

Design, experimentation, human factors, theory

Introduction

Storyboards and mock-ups are one way of gathering feedback on new interfaces or devices when the participants have direct experience of similar technologies. However, when the device or technology is unfamiliar, it can be difficult to get participants to engage intellectually and emotionally at a level that will

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Figure1. Peter explains to his doctor that exercise and diet are not working.

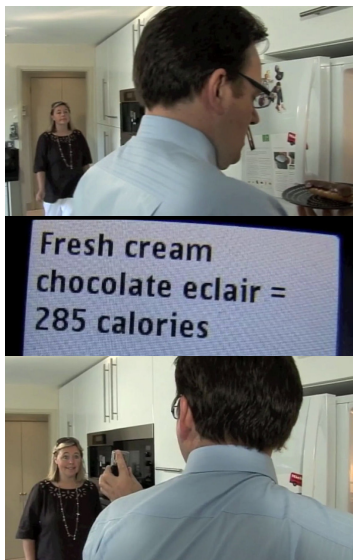


Figure2. Positive video. Peter demonstrates to his wife with enthusiasm and she is supportive.

allow them to consider how this will affect their everyday lives. Video can be a powerful tool for conveying a sense of how a futuristic or non-mainstream technology will affect a viewer in a variety of situations. The senses of hearing and vision can be brought into play, utilizing verbal, musical and visual codes so that the viewers can empathize with the characters portrayed by imagining themselves in the same situations.

Some well known examples are the visionary corporate videos from the 80s and 90s, such as Apple's Knowledge Navigator [1] or Hewlett Packard's Cooltown [2,4] where protagonists were shown having their lives significantly enhanced by the fictitious future technology. More recent examples include Microsoft's future healthcare videos [6]. Although this kind of video is immersive, one concern is that the narrative and context in which the technology is portrayed may bias the reported acceptability, usefulness and usability of the technology shown. There is growing concern regarding how various proposed personal technologies, such as pervasive healthcare, will affect privacy and identity [3] and it is unlikely that exclusively positive representations of these technologies will trigger user responses that allow exploration of these issues.

In this work, we ask the question: if positive representations of future technologies can trigger positive responses, what kind of responses could negative representations trigger? We use a new method, ContraVision, for eliciting user reactions and concerns by presenting both positive and negative aspects of a future technology in separate videos. Each video tells the same story with the same scenes and characters but with the characters' attitudes and

reactions being different in each video. We produced a pair of videos about a fictitious future diet technology and conducted a user study [5] to investigate the range of reactions to each video. We found that viewers of the negative version had overlapping but also different views not captured by the viewers of the positive representation, and vice versa.

Methodology

The ContraVision method was informed by the dual perspective to film-making which has been employed in a number of popular films and television episodes, usually described as Alternative Realities or Parallel Universes [7]. We developed two short films of the same topic that had similar and opposite characteristics that could be compared and contrasted. The videos are comparable in that they treat the same subject, use the same cinematic style, and are made of the same number of scenes representing the same situations with the same characters in the same locations. The videos are contrasting in that their main character has different attitudes and behaviors in relation to the technology and its adoption; the other characters also respond differently to the technology; the single respective scenes have different developments and the two stories have different outcomes.

Using a professional production crew and actors, we worked closely with the producer during the script development, the shooting and the finalization of the editing. In particular, the scripting and editing underwent several iterations to ensure that:

- the two videos were constructed symmetrically enough to be comparable but not to prevent the



Figure 3. Positive video. Peter gives his colleagues a demonstration of how DietMon works (Chris is wearing Peter's glasses and Peter is waiting for the text with the calorie count to reach his mobile phone).



Figure 4. Negative video. Peter is caught cheating on the diet by his wife.

exploration of aspects specific to each version of the scenario;

- the videos were long enough to allow viewers to immerse themselves in the represented scenario but not to overload them;
- the technology was represented in enough detail to appear realistic but not to lead viewers to focus on its technicalities.

The videos depict a wearable device designed to assist with people's healthcare and well being. The device makes use of tracking devices and sensors to record bodily functions such as heart rate, skin conductivity and blood glucose level. The system has much potential to improve the well being of people's lives, but at the same time raises contentious issues pertaining to privacy, security and acceptance. While it is designed to make losing weight easier through the provision of immediate feedback, it may also make people feel uncomfortable and awkward because weight loss is such a sensitive subject. The ContraVision approach is designed to uncover these different facets.

The Scenario

A fictional dieting support system called DietMon is the focus of the videos. The scenario used depicts Peter, a businessman in his early forties, who is overweight and would like to slim down. He claims to have been exercising and watching what he eats but he continues to gain weight (see Figure 1). So, the doctor invites him to try DietMon, a new technology that will assist him in his endeavor to slim down. DietMon consists of:

- glasses fitted with invisible cameras which take pictures of either food or menu items looked at by the wearer for more than three seconds
- a microchip in the user's wrist which monitors physiological changes taking place in his body as he eats (for instance, sugar or alcohol levels in the blood)
- a central server which receives real-time data from the glasses and chip
- a text message system which sends messages from the server to the user's mobile phone telling them the calorific value of the food image or menu item as well as when they are nearing their daily calorie limit as detected by the microchip.

To help viewers relate with the futuristic technology, we decided that DietMon should utilize three devices that are familiar to most people, even though in the video they perform unusual functions: a lot of people wear glasses, but these don't have cameras hidden in the frames; texting has become just as common as phoning, but mobile phones don't yet give us feedback about the food that we have eaten or are about to eat; microchips are already being implanted in people's limbs, but they are not yet able to record physiological information and transmit them over great distances.

The two videos take Peter through a series of situations in which he has to manage his relationship with the technology, with food and with other people (aside from the doctor, these are: his wife, his colleagues and a business client). Table 1 provides a brief description of the parallel structure between the six scenes of the videos (the italics highlight differences in the positive and negative representations of each scene's situation).

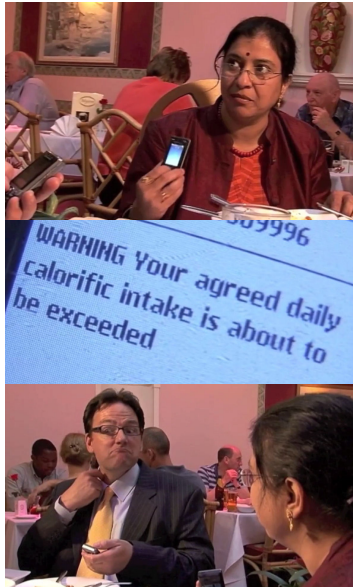


Figure 5. Positive version. Peter establishes complicity with his client when they both discover they are using DietMon.



Figure 6. Negative version. Peter throws away the cake, which is too big, rather than explain DietMon to his colleagues.

Although the videos have the same start, the different ways in which Peter manages his relationships with the technology, food and the people around him determines the stories' diverging progression, which ultimately leads to very different outcomes.

In the positive version of the scenario, Peter reacts to the doctor's proposition with enthusiasm, embracing the technology and the challenge that it poses. He trusts what the doctor says and that the technology can help him. He tells his wife about it with confidence and she reacts with encouragement (see Fig. 2). He does not let the technology stop him from joining his colleague's birthday celebrations and sharing her cake, but with the same confidence, he shows off with his colleagues too, managing to impress them (see Fig. 3). He plays with the technology checking out the calorie content of foods he comes across. He manages his relation with the technology proactively and positively, and when he forgets to wear his glasses, he does not panic, instead he works out the unchecked extra calories he has ingested and plans ahead to make sure he compensates at dinner by having lower calorie food. He even manages to use the technology to establish complicity with his client (see Fig. 5). By the end of the video, he has actually managed to achieve his goal and lose weight.

Peter's behavior is quite different in the negative version of the scenario. He is reluctant to try the new technology to start with. He seems unconvinced by what the doctor says and does not seem to believe that the technology will help. He unwillingly and unconvincingly tells his wife about it and her skeptical reaction just adds to his lack of belief in what he is doing. She then catches him cheating on the diet (see

Fig. 4). He is deceptive with his colleagues about the fact that he is on a diet, to the extent of throwing away the slice of cake because it is too big (see Fig. 6). He suffers at the sight of foodstuffs that the DietMon system rates as having too many calories. This results in him feeling guilty and behaving secretly in front of his wife. He manages his relationship with the technology passively and negatively: he overeats as soon as the phone goes silent; he does not have the foresight to plan ahead so he has to look at the menu at the table, which makes his phone beep; and because Chris is unaware of Peter's use of the technology, he questions Peter's choice of dish, which makes Peter uncomfortable. In the end, harassed by beeps and alerts he cannot justify, he gives up on the technology while eating excessively in front of his client.

At the end of each video, *in-character* interviews are appended. This is a meta-narrative technique, used in TV shows like *The Office* [9], whose function is to allow the viewers to reflect on different aspects of the fiction at a meta-level, through the things that the characters say as themselves during the interviews. In our case, the main characters answer questions about Peter and DietMon, which aim to explore the aspects described above. In the positive version of the scenario, their answers demonstrate a positive and even optimistic attitude towards Peter's endeavor, the technology and what it can do for him. In the negative version of the scenario, they display a negative and even cynical attitude towards both Peter and the technology. Speaking as themselves, they explore a number of issues related to the technology's features.

Findings

We have run a number of user studies [5] with focus groups viewing either the positive or negative video with respective in-character interviews. The results show that the viewers of the two videos reported reactions toward issues such as privacy, identity, and adoption which overlapped but also spanned a much wider range. This suggests that the ContraVision approach is useful for eliciting user reactions to the more subtle and emotionally driven effects of future technology.

Although producing multiple representations is more expensive than producing a single representation, our findings suggest that a single representation is insufficient to investigate deeper issues. Full versions of each video with respective in-character interviews may be downloaded from our website [8].

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Table 1. Scenes in the positive and negative versions of the scenario (the italics highlight differences in the positive and negative representations of each scene's situation)

Positive version	Negative version
Scene 1: at the doctor's	
Peter expresses his concern over his weight. The doctor suggests he uses DietMon and explains how it works. Peter asks questions and seems <i>satisfied</i> with the doctor's answers. He is <i>impressed</i> by what the technology can do and agrees to try it with enthusiasm.	Peter expresses his concern over his weight. The doctor suggests he uses DietMon and explains how it works. Peter asks questions and seems <i>perplexed</i> about the doctor's answers. He appears <i>skeptical</i> about the technology but agrees to try it anyway.
Scene 2: breakfast at home	
Peter starts preparing his breakfast with his new glasses on. His wife notices them and he <i>keenly</i> gives her a demonstration of what they are and how they work, and tells her about the microchip. She seems <i>impressed</i> and leaves the room to get ready for work. Peter opens the fridge to put away the butter and sees a pastry. He looks at it and gets a DietMon message telling him the calorie content of the pastry. He shows that to his wife, who is entering the kitchen and looks at him with a <i>smile</i> .	Peter prepares breakfast with his new glasses on. His wife notices them. While looking at his toast, he gets a text. His wife enquires what that is. He says it's nothing and he does not feel like having toast after all. When she questions why he becomes <i>tense</i> and <i>reluctantly</i> tells her about DietMon. <i>Skeptical</i> , she leaves the room with a sarcastic comment. Peter opens the fridge and sees a pastry. As he gives in and takes a bite, he is caught by his wife, who is entering the kitchen and looks at him with a <i>grin</i> .
Scene 3: birthday party at the office	
Peter is working away at his desk when some colleagues invite him to a small birthday celebration. He tries to refuse but they insist. As he joins them, wearing his glasses, he greets the birthday-lady. His colleague Chris serves him a slice of cake. Peter looks at it and takes out his mobile. He gets a text, checks it and says the slice is too big, and asks Chris to cut it in a half. Chris is intrigued and asks for an explanation, so Peter gives his colleagues a <i>keen</i> demonstration of how the technology works. His audience is <i>impressed</i> , gathered around him.	Peter is working away at his desk when some colleagues invite him to a small birthday celebration. He tries to refuse but they insist. As he joins them, wearing his glasses, his colleague Chris gives him a slice of cake. He takes the plate and greets the birthday-lady. He gets a text and, <i>pretending</i> it's an important phone call, moves <i>away</i> from the others with the cake. Turned away from them, he <i>throws</i> the cake in a bin and goes back pretending to have already finished it. Chris comments on how fast he ate. Peter excuses himself, saying he has a deadline to meet, and leaves.

Scene 4: outside the bakery	
Peter is passing by the window of a bakery, with his glasses on, and stops to look at the different foods. He takes out his phone and, looking at each tray in turn, waits for the text with the calorie count. Each time he <i>giggles</i> . Once he has gone through the trays, he walks off with an <i>amused expression</i> on his face.	Peter is passing by the window of a bakery, with his glasses on, and stops to look at the different foods. As he looking at each tray in turn, he gets a beep from his mobile in his pockets. After many beeps, as he is finished looking at all the trays, he walks off with a <i>pained expression</i> on his face.
Scene 5: a drink at the bar	
Peter is having a glass of water and nibbling at a bowl of Bombay mix. This time he has forgotten to wear his glasses. As Chris enters the bar he gestures to remind Peter about the glasses. Peter puts them on and tries to assess the calories he has been eating by picking up and looking at a spoonful of the mix. He then picks up the menu and, in <i>preparation</i> for the imminent dinner, checks the calorie content of each dish.	Peter orders a glass of water, his glasses on. He looks at a bowl of Bombay mix, expecting a text, but none arrives. He checks his phone: nothing happens. He starts nibbling at the mix. Chris enters the bar and asks whether the mix is good. Peter confirms and keeps eating. Suddenly he gets a text: an apology for the temporary interruption of service; then more texts with the calorie count of the mix he has been eating. He is <i>disappointed</i> .
Scene 6: business dinner at the restaurant	
Peter is sitting at the table with Chris and a client. While the others look at the menu, he says he has already made his choice and is going to try a new dish: Tandoori fish. As they are all eating and conversing, a phone alarm goes off. Peter thinks it is his phone and checks it. However, it is not his phone, it is the phone of the client. She goes to switch it off and guesses that Peter must be using DietMon too. She looks at Peter and shows him the screen of her phone, displaying a warning that she is about to reach her daily calorie allowance. They <i>smile</i> at each other. She gestures to ask if it works and Peter pulls the collar of his shirt to show he has <i>lost weight</i> . The client <i>smiles</i> and says out-loud that she has had enough to eat.	Peter is sitting at the table with Chris and a client. As they are all looking at the menu, Peter's phone beeps, he checks the message and says he is going for Tandoori fish. Chris comments that is an unusual choice for Peter, since his favorite dish is chicken Tikka Masala. Peter uncomfortably replies that he wants to try something new. As they are all eating Peter gets an alert: a warning that he is about to reach her daily calorie allowance. He <i>embarrassingly apologizes</i> and says it's an alarm to remind him of something. He keeps eating. Shortly he gets another alert and apologizes again saying that there must be something wrong with the phone. He also takes his glasses off saying that they are new and uncomfortable. He keeps eating.